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ROUTING		
TO: NAME AND ADDRESS	DATE	INITIALS
1 JAC		
2		
3		
4		

	ACTION		DIRECT REPLY		PREPARE REPLY
	APPROVAL		DISPATCH		RECOMMENDATION
	COMMENT		FILE		RETURN
	CONCURRENCE		INFORMATION		SIGNATURE

REMARKS:

FROM: NAME, ADDRESS, AND PHONE NO.	DATE

ADMIN 9.7

TOP SECRET
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Handle Via

BYEMAN

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NRO Review Completed.

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DISSEMINATION CONTROL ABBREVIATIONS

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CENTRAL INTELLIGENCE AGENCY
WASHINGTON, D.C. 20505

14 APR 1976

BYE-8368-76
Copy 2

MEMORANDUM FOR: Director, National Reconnaissance Office

SUBJECT : A-11 (OXCART) and D-21 (TAGBOARD) Disposition Planning

REFERENCE : Your Memorandum, same subject dated 10 March 1976

1. We have reviewed the preliminary plan for disposition of the residual NRP aircraft assets provided in your referenced memorandum and are in general agreement with the plan.

2. All contract assistance to date for the A-11 and D-21 has been provided by this Directorate and can be continued until the transfer of aircraft to the terminal location is completed. Mr. Williams of my Contract Staff should be the point of contact for this support.

3. There are some security problems with the proposed cover plan which are being reviewed with your staff and should be resolved prior to final disposition activities. Mr. Wilkinson of my Security Staff should be the point of contact for these continuing discussions.

25X1

CARL E. DUCKETT
Deputy Director
for
Science and Technology

ILLEGIB

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(S) NATIONAL RECONNAISSANCE OFFICE
WASHINGTON, D.C.

OFFICE OF THE DIRECTOR

10 March 1976

MEMORANDUM FOR THE DEPUTY DIRECTOR FOR SCIENCE AND TECHNOLOGY

SUBJECT: A-11 (OXCART) and D-21 (TAGBOARD) Disposition Planning

The attached preliminary plan concerning the relocation of residual National Reconnaissance Program aircraft to the Military Aircraft Storage and Disposition Center, Davis-Monthan AFB, Arizona, is provided for your information and comment.

The Chief of Staff, USAF, has been requested to establish a cleared working group to finalize this preliminary plan for joint approval. Because of your interest in this subject, and the NRO's need for DDS&T contracting assistance in relocating these aircraft, I would welcome participation by members of your staff in finalizing disposition actions.

[redacted] 25X1

J. W. Plummer

1 Attachment
Disposition Plan for BYEMAN
[redacted] 25X1
(BYE-12574-76)

[redacted] 25X1

CLASSIFIED BY BYEMAN - 1 EXEMPT FROM GENERAL DECLASSIFICATION SCHEDULE OF EXECUTIVE ORDER 11652 EXEMPTION CATEGORY 5B2 DECLASSIFY ON IMP DET.

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AIR STAFF PERSONNEL
BRIEFED ON BYEMAN STUDIES [redacted]

25X1

NAME	OFFICE
Colonel [redacted]	LGYJ
Colonel [redacted]	LGYJ
Colonel [redacted]	PRPL
Major [redacted]	XOOSR

25X1

CLASSIFIED BY BYEMAN 1 EXEMPT FROM GENERAL DECLASSIFICATION SCHEDULE OF EXECUTIVE ORDER 11652 EXEMPTION CATEGORY 5B2 DECLASSIFY ON IMP DET.

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Attachment 1

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DISPOSITION PLAN

FOR

BYEMAN STUDIES

[redacted]

25X1

MAJOR ASSETS

CLASSIFIED BY BYEMAN 1 EXEMPT FROM GENERAL DECLASSIFICATION SCHEDULE OF EXECUTIVE ORDER 11652 EXEMPTION CATEGORY 5B2 DECLASSIFY ON IMP DET

Attachment 2

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Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

CONTENTS

SECTION

TABS

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

RECORD OF APPROVALS
AND COORDINATION

APPROVED

Director, National Reconnaissance Office	Chief of Staff, USAF

COORDINATION

Comptroller, NRO	AF/PR
Director, NRO Staff	SAF/OI
CIA/DDS&T	AF/LG

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1.0 PURPOSE

This plan issues policy and guidance required to (a) transfer nine A-11 aircraft and 17 D-21 drones from the National Reconnaissance Program (NRP) to the USAF, (b) declassify the physical assets, and (c) relocate assets to permanent storage areas during Fiscal Year 1977.

2.0 SCOPE

2.1 Sufficient detail is contained in this plan to preclude the necessity for any other formal agreements concerning the disposition of major assets associated with BYEMAN [redacted] (A-11) or BYEMAN [redacted] (D-21). 25X1 25X1

2.2 The content and organization of the remainder of this plan are summarized as follows:

SECTION 3.0	Project Schedule - Key Events
SECTION 4.0	Background - brief discussion of the A-11/A-12 and D-21 projects; no current requirement; impact of B-1 production on A-11 storage area.
SECTION 5.0	Concept - relocate A-11 and D-21 assets to MASDC for continued extended storage.
SECTION 6.0	Management Organization and Responsibilities - details tasking on NRP and Air Staff elements.
SECTION 7.0	Funding and Contracting - approximately [redacted] and Lockheed support will be required for terminal relocation. 25X1
SECTION 8.0	Security - reviews rationale for, and presents a statement of terminal security policy.
SECTION 9.0	Information - unclassified statement of A-11 and D-21 history.

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

3.0 PROJECT SCHEDULE

EVENT	OPR	NLT DATE
1. Plan coordination and approval	NRO/SS-4	15 Apr 76
2. AFLC provides:	AF/PRPL	30 Apr 76
a. MASDC information and input schedule.		
b. Asset preservation cost		
3. Finalize contractor's statement of work	NRO/SS-4	15 May 76
4. Negotiate FY 77 storage and disposal contract	CIA/OD&E	31 May 76
5. Relocate D-21 to MASDC commencing Jul 76	[redacted]	31 Dec 76
6. Relocate A-11 to MASDC	NRO/SS-4	31 Jun 77

25X1

4.0 BACKGROUND

4.1 The A-11/A-12 aircraft was operated for the NRP by CIA from 1962 through mid-1968. With its mission assumed by the USAF SR-71, the nine ship fleet was placed into non-flyable storage at Site 2, Plant 42 (Lockheed), Palmdale, California in June 1968.

4.2 The D-21 drone was developed by the NRP for use in conjunction with the A-11/A-12. Subsequent to A-12 deactivation, the D-21 program was relocated to Beale AFB, California, and adapted to the B-52H launch platform. [redacted]

25X1

4.3 During May 1975, the Director of Central Intelligence, Assistant Secretary of Defense (Intelligence), Director, National Reconnaissance Office, and the Vice Chief of

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

Staff, USAF, determined that there was no current NRP or USAF requirement for the A-11/A-12. Since program termination no further D-21 requirement has been identified.

4.4 B-1 production facility planning envisions use of the A-11/A-12 storage area within Plant 42 late in CY 1977. This planning dictates the removal of these assets not later than 30 June 1977.

5.0 CONCEPT

5.1 A-11/A-12 airframes including engines not required by the SR-71 program will be shipped from Plant 42 at a rate slightly in excess of one airframe per month commencing October 1976.

a. A-11 airframes will be shipped by surface to the Military Aircraft Storage and Disposition Center (MASDC), Davis-Monthan AFB, Arizona, for extended storage (Code XW) and/or operational withdrawal as required by USAF.

b. "XW" Storage is defined in this plan as "inactive aerospace vehicles in storage which have a low probability for operational use by the Air Force or other agencies. Parts may be removed with the approval of the AFLC/System Manager without action to acquire a repairable replacement. Upon input to storage, aircraft will be prepared for storage at minimum cost, and for a period in excess of 90 days."

5.2 D-21 drone airframes will be shipped by and [redacted] to MASDC for XW storage at an approximate rate of three per month commencing July 1976. 25X1

5.3 Engines not required by the SR-71 Program or USAF depots will be shipped to MASDC.

5.4 Effective with plan approval, overt "ownership" of A-11 and D-21 assets will transfer from the NRP to the USAF; however, the NRP will remain responsible for physical relocation activity.

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

5.5 The use of plastic laminated structures on the A-11/A-12 and D-21 airframes will not limit normal USAF/MASDC storage and display procedures.

6.0 <u>MANAGEMENT ORGANIZATION AND RESPONSIBILITIES</u>

6.1 The National Reconnaissance Office (NRO) Staff focal point for disposition activity is the Deputy Director for Operations (SS-4). He is responsible for:

a. All aspects of relocation and transfer planning.

b. Submitting project budgetary estimates to the NRO Comptroller.

c. Directing the activities of [redacted] 25X1
D-21 relocation, and coordinating contracting officer support relative to A-11 items.

d. Arranging for U.S. Government contracting with Lockheed Aircraft Company.

6.2 The NRO Comptroller is responsible for effecting the funds transfer arrangements necessary to support this plan.

6.3 AF/PRPL is responsible for:

a. Acting as the "white" owner of A-11 and D-21 assets in relocation transactions.

b. Advising HQ AFLC of disposition planning, and (1) obtaining MASDC input schedules and capabilities to support arrival off-load operations; (2) obtaining cost data relative to the "XW" storage of A-11 and D-21 assets.

6.4 AF/LGYJ is recognized as both the Site 2, Plant 42 facility administrator and logistic focal point for the SR-71. As such, LGYJ will: be apprised of A-11/A-12 relocation planning, scheduling and progress.

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

7.0 FUNDING AND CONTRACTING

7.1 Funding

a. The relocation of A-11 and D-21 major assets will require, in very rough-order-of-magnitude, to achieve the following: 25X1

	ROM COST
(1) A-11 Relocation	
(a) 9 A-11s to MASDC	
(b) MASDC Preservation Support	
Subtotal, A-11	
(2) D-21 Relocation	
(a) 17 D-21s to MASDC via C-5	
(b) MASDC Preservation	
Subtotal, D-21	
TOTAL COST	

25X1

b. Cost-sharing arrangements, as applicable, will be initially coordinated between the NRO Staff and Air Staff. The NRO Comptroller will approve final cost-sharing arrangements and provide for the transfer of NRP funds as necessary.

c. Separate USAF action will be taken to fund periodic maintenance actions required for the extended MASDC storage of A-11 and D-21 assets (approximately $1,000/Acft/Yr).

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

7.2 Contracting (Preliminary Concepts)

7.2.1 The A-11 storage contract with Lockheed will be modified for FY 1977 to provide the following contractor services between 1 October 1976 and 31 June 1977.

a. Rehabilitate the special A-11 transport trailer.

b. Minimum disassembly of A-11 aircraft for surface movement.

c. Surface movement of 9 A-11s from Palmdale to MASDC.

d. Reassembly of A-11s at MASDC.

e. Preparing A-11 storage area, Site 2, Plant 42, for turnover to AF/LGYJ.

f. [redacted] 25X1

7.2.2 Prior to contract negotiation, the tasks outlined in Paragraph 7.2.1 above may be modified in view of AFLC provided information covering:

(a) MASDC capabilities to arrange off-loading and surface towing of A-11 and D-21 assets.

(b) Requirements for contractor support assistance in final display/parking activities.

8.0 <u>SECURITY</u>

8.1 Termination security policy has been developed in consideration of the following:

(a) The A-12 and D-21 materials, contract and administrative documentation, developmental and operational listing were controlled under the BYEMAN Control System. The assets were identified as OXCART (A-11/A-12) and

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Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

TAGBOARD (D-21). Following project termination, all details were retired within BYEMAN Control System with access being controlled by BYEMAN [redacted] 25X1
(A-11/A-12) UNCODED (D-21). A uniquely sensitive 25X1
fact about OXCART was the technology and use of state-of-the-art laminated plastic structures.

b. Original Lockheed proposals and designs for the A-12 reflect aircraft designation A-11. The fact that the aircraft exists was disclosed by President Johnson on 24 February 1964. This disclosure revealed an "experimental USAF role"; however, use of laminated plastics was not disclosed. Airframe technology has been released through the SR-71 program.

c. Existence of the D-21 as an unmanned experimental vehicle, including its association with the B-52H has been considered unclassified since early 1968; however, no technology releases have been made.

8.2 Security Policy

a. Actual OXCART and TAGBOARD history documentation and contracting modus operandi will continue to be controlled within the BYEMAN Control System.

b. Transfer documentation and Air Force records will reflect A-11 and D-21 designations.

c. Any public release in excess of the attached approved statement and questions and answers require NRO approval.

d. The unclassified display of these aircraft assets at MASDC is authorized. Positioning in areas not frequented by the public/tour groups is desired.

e. Transfer of assets out of MASDC, gift to other government agency, or sale to foreign governments require Secretary of the Air Force approval.

f. NRO, NRP, or CIA participation in the programs may not be revealed.

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

9.0 INFORMATION

9.1 Unclassified public information releases for MASDC use and/or response to press and public queries have been developed in consideration of President Johnson's official press release (TAB C); a feature article on the A-11 that appeared in Air Force and Space Digest, April 1964 (TAB D); and Jane's 1974-1975 Year Book. Requests for information that is not contained in the following paragraphs will be referred through channels to the Secretary of the Air Force, Office of Information (SAFOIP) for response.

9.2 The following general information may be used as necessary in response to query from the news media or general public:

THE A-11

The Air Force has initiated a program to retire Lockheed A-11 aircraft to the Military Aircraft Storage and Disposition Center (MASDC) near Tucson, Arizona, during the period October 1976 through June 1977.

The A-11, predecessor of today's SR-71, was a reconnaissance aircraft of the 1960s and represented a pioneering technical achievement in the milling, machining and shaping of titanium for aerodynamic applications.

In February 1964, President Johnson announced that the A-11 had been tested in sustained flight at speeds above 2,000 mph and at altitudes above 70,000 feet. The development of the A-11 program and its achievements made possible the incorporation of its technological findings in the SR-71, YF-12A, D-21 drone programs and the commercial Supersonic Transport (SST).

By mid-1968, the A-11's reconnaissance role was assumed by the SR-71, and the A-11's drone package, the D-21, received further refinement and testing with SAC's B-52 force. The A-11 fleet was then placed in reserve to serve as attrition replacements for the SR-71 -- a contingency that fortunately did not develop.

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

Performance data of interest includes:

SPEED	MACH 3.0
ALTITUDE	80,000 FT
RANGE	3,000 NM
WING SPAN	57 FT
LENGTH	102 FT
GROSS WEIGHT	64,000 LBS
ENGINE	J58
FIRST FLIGHT	April 1962
LAST FLIGHT	May 1968
EXPERIMENTAL PAYLOAD	D-21 Drone

9.3 The following questions and answers will be made available by SAFOI to SAC, AFLC, Command Information Officers and to Base Information Officers at Davis-Monthan AFB, Arizona (MASDC) and Norton AFB, California for release only upon direct query.

Q. How many A-11s did the Air Force build?

A. 15; five were lost under non-hostile circumstances; one was provided to NASA; nine remain.

Q. How many D-21s did the Air Force build?

A. 38.

Q. Where/when were the A-11s built?

A. Lockheed-Burbank. 1959-1960.

Q. Where/when were the D-21s built?

A. Lockheed-Burbank during 1964-1965 and 1967-1969.

Q. When were the A-11s retired?

A. June 1968.

Q. When were the D-21s retired?

A. June 1971.

Q. Where were the A-11s after retirement?

A. In a government facility at Palmdale, California.

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Q. Where were the D-21s stored?

A. In a warehouse at [redacted] 25X1

D. Did they (A-11/D-21) overfly USSR? China? SEA?

A. Information related to the missions of reconnaissance aircraft is classified.

Q. Did they take photographs?

A. Yes, aerial reconnaissance pictures were taken.

Q. Will a photograph be released?

A. No.

Q. Why did Air Force not reveal the A-11 when they were retired?

A. The state-of-the-art technology contained in this aircraft and its contingency role as an attrition replacement for the SR-71 were major considerations in limiting information on this system.

Q. What bases were used?

A. Edwards AFB, California and [redacted] 25X1

Q. Was CIA involved in the A-11 program?

A. The CIA did cooperate with the USAF in the system definition of this aircraft's capability.

9.4 Questions of the following nature will be released only by SAFOIP:

Q. What Air Force agency bought the A-11s and D-21s?

A. Aeronautical Systems Division, AFSC.

Q. What Air Force agency operated them?

A. A special group under USAF Headquarters Command.

Q. When were the A-11s considered operational?

A. November 1965.

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

Q. What did the A-11 cost?

A. Approximately [redacted]

25X1

Q. What did the D-21 cost?

A. Approximately [redacted] each.

25X1

Q. What was the line number in the Air Force budget?

A. It was listed as a classified program.

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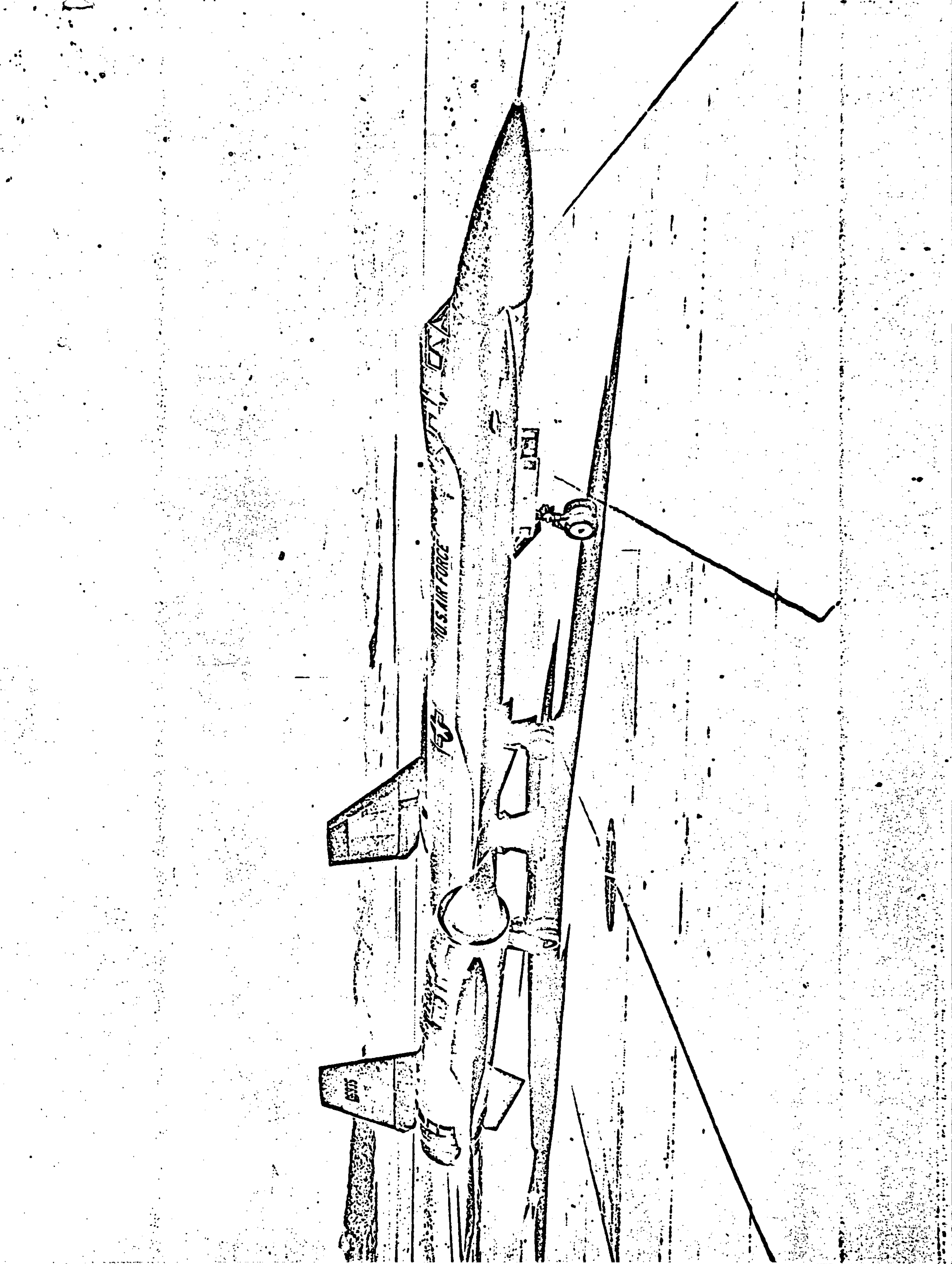

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TAB B

PRESIDENT LYNDON B. JOHNSON'S 24 FEBRUARY 1964 A-11 STATEMENT TO THE PRESS

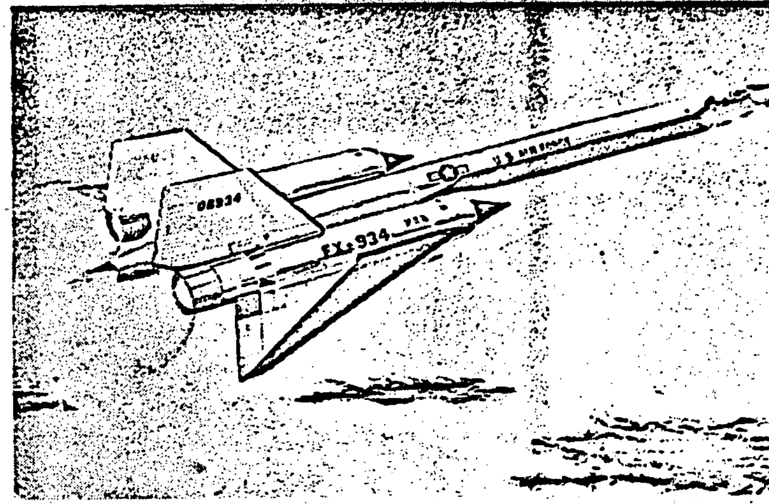
"The United States has successfully developed an advanced experimental jet aircraft, the A-11, which has been tested in sustained flight at more than 2,000 miles per hour and at altitudes in excess of 70,000 feet. The performance of the A-11 far exceeds that of any other aircraft in the world today. The development of this aircraft has been made possible by major advances in aircraft technology of great significance for both military and commercial applications. Several A-11 aircraft are now being flight tested at Edwards Air Force Base in California. The existence of this program is being disclosed today to permit the orderly exploitation of this advance technology in our military and commercial program."

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

AIR FORCE
APRIL 1964

The official pictures and statements tell very little about the A-11. But the technical literature from open sources, when carefully interpreted, tells a good deal about what it could and, more importantly, what it could not be. Here's the story . . .



—Illustration by Gordon Phillips

A-11

Born in the Skonk Works, Reared in Secret, It Blazes New Heights in Aircraft Performance

By J. S. Butz, Jr.
TECHNICAL EDITOR, AIR FORCE/SPACE DIGEST

THE dramatic disclosure last month that the United States has manned airplanes that are secretly *cruising* at speeds above Mach 3 was good news to the aviation community.

President Johnson, in revealing the Lockheed A-11 program, showed understandable pride in this important US "first." He said that "several" A-11s were being flown "at more than 2,000 mph and at altitudes in excess of 70,000 feet," and are "capable of long-range performance of thousands of miles." The President added that the A-11 "has been made possible by major advances in aircraft technology of great significance for both military and commercial application."

He mentioned only one specific application. He said that the A-11 was being tested extensively to determine its suitability as a "long-range interceptor." Former White House Press Secretary Pierre Salinger and Defense Secretary Robert S. McNamara stressed the interceptor role in their brief expansions of the President's remarks. However, Mr. McNamara, in response to insistent questioning by reporters, has indicated that the A-11 was not designed originally as an interceptor but that he has considerable confidence that it can be adapted to that role.

Beyond these minimum remarks, the secrecy lid has been clamped on. The Administration opened the door on the most tantalizing aviation news since the X-1 proved there wasn't a sonic barrier. But the door was slammed shut immediately.

From the technical viewpoint, the A-11 clearly is the most important aircraft since the X-1. It is by far the most efficient airplane yet to fly at supersonic speeds. It is the first to have adequately high aerodynamic efficiency (low drag) and high powerplant efficiency to allow it to carry enough fuel to sustain flight above Mach 1 for more than thirty minutes or so. In the President's words, the A-11 also is extremely important because it led to "the mastery of the metallurgy and fabrication of titanium metal which is required for the high temperatures experienced by aircraft traveling at more than three times the speed of sound."

As reported by Claude Witze on page 16 of this issue, a tight information clamp has forestalled meaningful public discussion of the A-11, its genesis, or its proper role in civil and military aviation.

The following questions are typical of those which should be asked, for the answers concern the use of a very large sum of the taxpayers' money. Congress and the public have a legitimate right to frank answers.

- How much did the A-11 and its engines cost? Judging from previous pioneering programs that fought their technical battles out beyond the "state of the art," the A-11, with its Mach-3-plus performance, titanium construction, and high-temperature engines cost at least $500 million and possibly $1 billion. That is $100 to $200 million per year for the five years the program has been active. (President Johnson said the

(Continued on following page)

Approved For Release 2008/11/18 : CIA-RDP90B00170R000200290003-9

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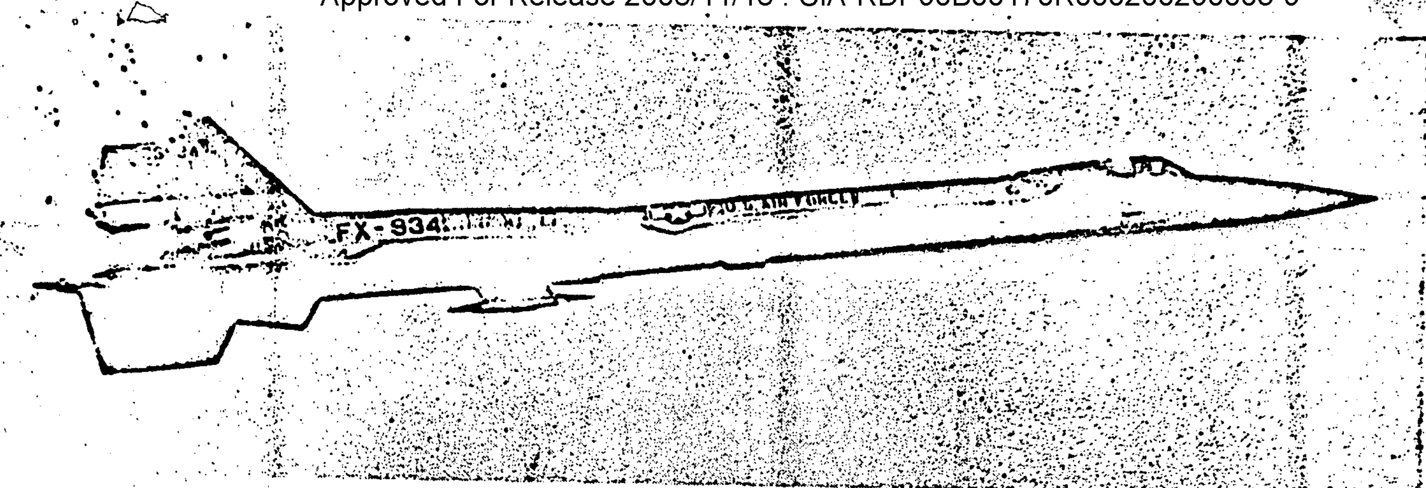

Window arrangement of A-11 may indicate a three-man crew. The large ventral fin shown here raises the possibility of zero-length launch. This takeoff technique may be used for high-performance aircraft to conserve fuel and increase range. Openings at the rear of the nacelles feed air to convergent-divergent nozzles needed for efficient engine operation.

A-11 design work started in 1959. The J58 program was initiated several years earlier by the Navy.) This kind of money is in the cost range of the much-criticized and now-defunct nuclear airplane, and programs of this magnitude should get a thorough working over by the Congress.

• The "obvious" conclusion to be drawn from the information available is that the A-11 was originally developed for the CIA as a high-altitude reconnaissance airplane to replace the U-2. Most reporters reached this conclusion, supported largely by the close secrecy on the airplane, Mr. McNamara's refusal to divulge the original design objective, and the fact that the project was not handled in normal management channels. If this conclusion is correct, several questions arise immediately concerning the past and future expenditure of large sums of money:

(1) Does the fact that a given airplane can cruise at Mach 3 also mean that it automatically has a multipurpose capability — reconnaissance, interceptor, bomber — without a major design change for each type of mission?

(2) If the answer is no, was there coordination between the CIA and the DoD at an early stage to make certain that the A-11 was not hopelessly boxed into one role?

(3) Can the A-11 development expedite the supersonic-transport (SST) program?

(4) Have reconnaissance satellites eliminated the need for reconnaissance aircraft such as the A-11, and will it therefore end up only as a high-cost experimental aircraft with limited capability?

Precise answers will require the most candid discussion of the current version of the A-11 and its design and development history. Certainly no one can judge the exact performance or mission capability of a supersonic-cruise airplane using only the two side-view photographs and brief statements currently available on the A-11.

Estimates of this type are riskier for supersonic-cruise airplanes than they are for subsonic aircraft or for those that are capable of only short dashes at supersonic speed.

Basically, supersonic-cruise airplanes involve extremely difficult design problems. Their payload-range performance is extremely sensitive to engine weight, structural weight, fuel consumption, and aerodynamic efficiency (lift/drag ratio, written L/D). Small mistakes in predicting these values can lead to large errors in payload and range.

Fortunately, the supply of technical literature concerned with these problems is large. This literature points to some general conclusions about the A-11 and places some broad limits on the possible performance of this new aircraft.

The difficulties described in this literature also provide the best tribute to Clarence L. (Kelly) Johnson and his "Skonk Works" colleagues at Lockheed, who, with the J58 engineers at Pratt & Whitney, led the team that first achieved supersonic cruise.

Here is what can be deduced about the A-11, based on this literature:

• Size. The airplane is about ninety feet long based on scaling of the A-11 pictures, using published data on the J58 diameter and estimating the size of the pilot's helmet visible in the front window. There is room in the slim fuselage and in the wing stub areas for more than 70,000 pounds of fuel, with space left over for substantial mission equipment. Since efficient supersonic-cruise airplanes have to carry at least fifty percent of their weight in fuel, the A-11 takeoff weight apparently is more than 150,000 pounds. This is roughly the same as that of the B-58 bomber.

• Wing. Densely loaded aircraft such as the A-11 need large wing areas; otherwise their wing loadings will quickly rise above 100 pounds per square foot and severely reduce both cruise altitude and flight efficiency.

The side-view photographs obscure most of the A-11 wing, and published drawings of the A-11 have not indicated a large lifting surface. However, the aircraft must have an effective wing area in the neighborhood of 2,000 square feet. This includes not only the area outboard of the engine nacelles (*see drawing on the front cover*) but also the area between the engines, and the area of the long, very narrow wings

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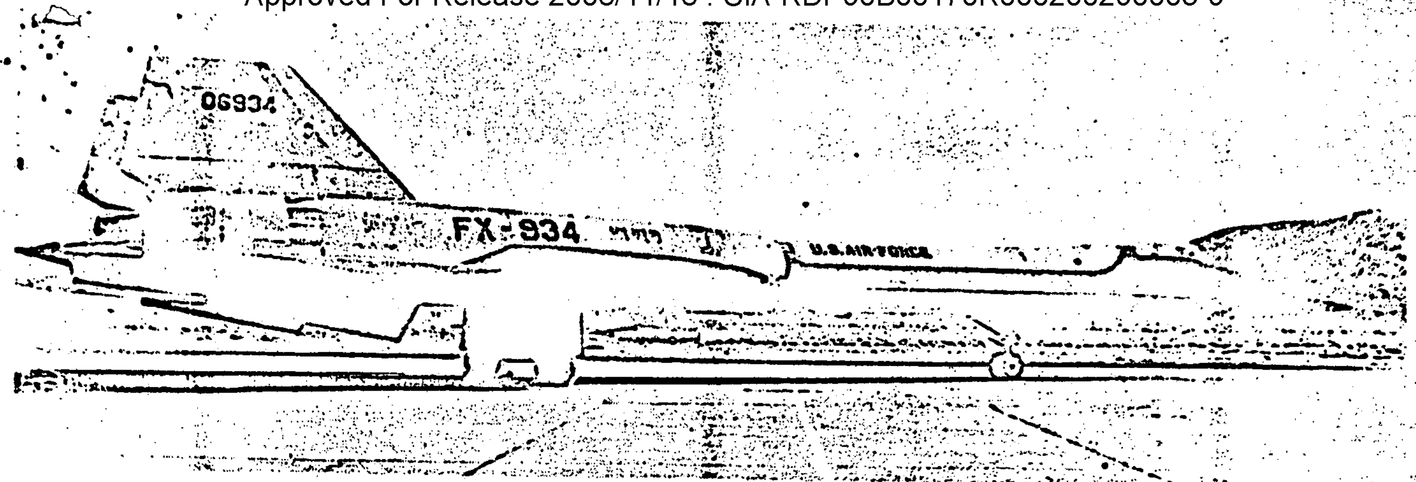

Twist and camber in outboard wing section is visible in this photo of A-11 configuration rigged for conventional takeoff with standard-length landing gear and minus the large ventral fin shown on model at left. Flight tests of the X-15 revealed that X-15 did not need its large ventral fin for adequate directional stability at supersonic speed.

on the fuselage, which have been referred to in some reports as fairings. The long and narrow wings form the forward section of a large double-delta wing similar to that used by Lockheed in its supersonic-transport proposal. At supersonic speeds these long, narrow wings plus the fuselage area between them generate much more lift than they do at subsonic speeds.

This generation of additional lift up forward is important in maintaining control over the airplane above Mach 1. The controllability problem arises because the rear portion of the double delta acts like a conventional lifting surface at supersonic speeds, and its center of lift moves abruptly aft, a long distance away from the center of gravity. This can make the aircraft so stable that it can't be controlled by a normal-size horizontal tail. In any event, it calls for a large deflection of the tail and an unacceptably big trim drag, which eats into range. On the A-11, lift on the long, narrow wings counteracts the shift of center of lift on the main surface and keeps the center of lift near the center of gravity. On some designs a small canard (horizontal) surface near the nose serves this purpose. The Swedish Saab Draken, the Mach 2 fighter operational for several years, was the first of the so-called "tailless" (no conventional horizontal tail and no canard) airplanes to use the double-delta planform.

- **Design Mach Number.** The centerbodies of the engine air inlets on the A-11s in the photographs released by the White House appear to have a ramp angle suitable for a maximum economical cruise speed slightly above Mach 3.
- **Cruise Altitude.** Most press reports have placed the A-11's maximum cruise altitude between 90,000 and 125,000 feet. This appears to be a serious error. There is a well-established procedure for checking maximum cruise altitude. It indicates that the A-11 must cruise between 70,000 and 80,000 feet or its range will severely suffer. Thus, the A-11 can be expected to get its maximum range while cruising about 5,000 to 10,000 feet below the U-2. The U-2's superior wing and lower wing loading give it better altitude capability in unaccelerated flight. But in a zoom climb the A-11 would outperform it.

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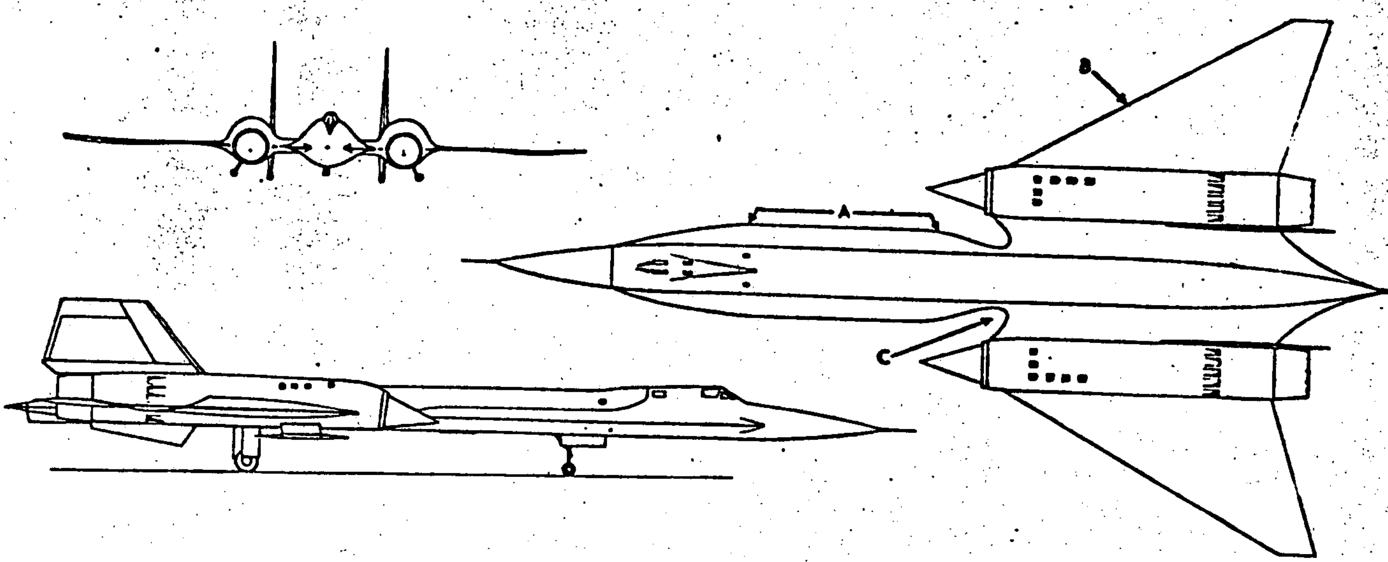

A-11's modified double-delta wing shows in this three-view drawing. The forward delta extends straight back from just ahead of the pilot's canopy, rearward to the engine air inlets (letter "A"). The rear delta is outside of the engine nacelles (letter "B"). A cutout similar to that shown at "C" must be used to keep low-energy boundary layer air passing along the forward delta from entering the engine inlet, lowering engine efficiency and creating heavy unbalancing forces on the compressor. Such a cutout would be critical in creating favorable flow on rear fuselage ramp.

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To figure maximum cruise altitude you have to know two characteristics of any aircraft—the wing loading (written W/S and equal to the gross weight divided by the wing area), and the lift coefficient (written C_L, a dimensionless number indicating the lifting power of the wing) generated when the aircraft is flying at the proper angle of attack for maximum range (maximum aerodynamic efficiency). When the W/S is divided by the C_L, it equals the dynamic pressure required to keep the aircraft in level flight. The dynamic pressure is the term that fixes the altitude of flight for any given speed.

There is enough information on the A-11 to put the above relationships to work. For instance, when the A-11 is flying at Mach 3 at 70,000 feet, the dynamic pressure is nearly 600 pounds per square foot. The lift coefficient for maximum L/D is about .1 (this has been confirmed in many NASA reports on aircraft similar to the A-11). So 600 may be multiplied by .1 to give a maximum possible wing loading of about 60 pounds per square foot. This is about the wing loading the A-11 would have if it had a 2,000-square-foot wing area, weighed 150,000 pounds at takeoff, and burned about one-third of its 75,000-pound fuel load during its climb to altitude.

This procedure can be run through again to show that the A-11's wing loading would be a little better than thirty pounds per square foot once it had burned all its fuel. It, therefore, would end its cruise at Mach 3 at 80,000 feet.

Speed would not change this picture too much. If the A-11 were capable of Mach 4, it would begin its cruise at about 82,000 feet and in the lightened condition at the end of cruise would be flying at nearly 95,000 feet.

The press reports of 125,000-foot altitude completely fall apart under check. If the A-11 flew at that altitude at Mach 4 it would need a wing loading of less than ten pounds per square foot. In other words its structure could not be any heavier than that of a Piper Cub.

Or, if the A-11 tried to fly at 125,000 feet at a wing loading of about thirty pounds per square foot, corresponding to an end-of-cruise weight, its speed would have to be at least Mach 8 to maintain level flight and to keep it from stalling out.

The same procedures can be used to show that the U-2's altitude during maximum range cruise will vary from about 75,000 feet to a little more than 90,000 feet.

Another check on the operational altitude of the A-11 can be made by examining the engine air inlets which appear to be about six feet in diameter at the most. Therefore, the maximum capture area for both inlets to take in air is between fifty and sixty square feet. This is just about enough to fly an airplane like the A-11 at 80,000 feet at Mach 3. At 100,000 feet at Mach 3 the required capture area goes well over 100 square feet. At 125,000 feet the inlets would become truly gigantic.

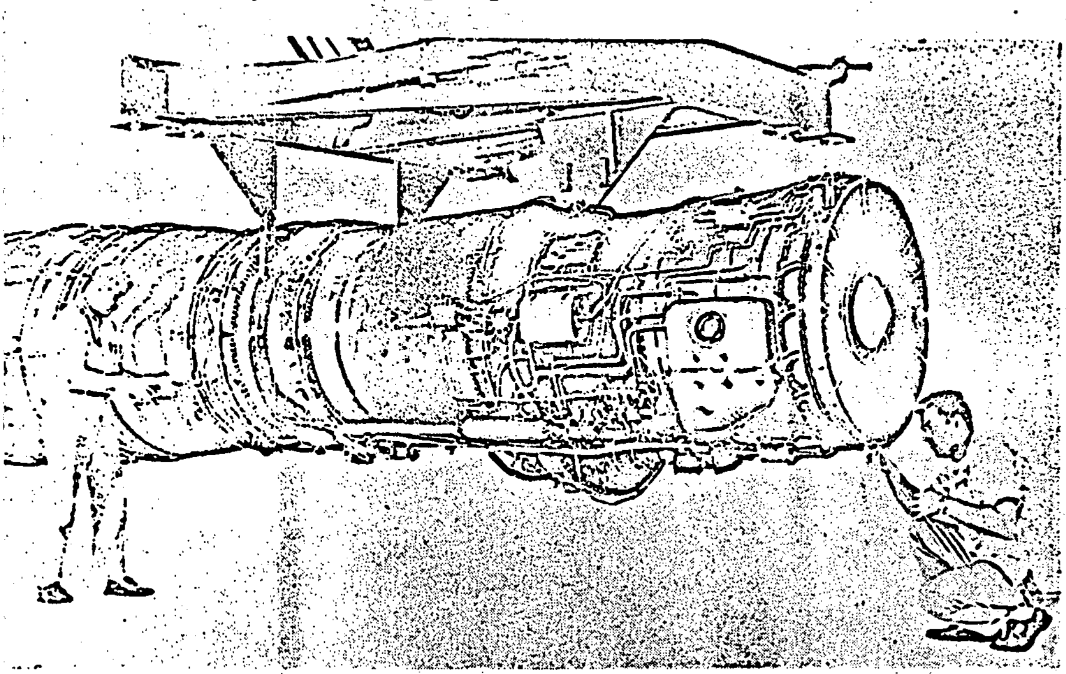

Photo shows early model J58 turbojet. One of few showings of this engine was at AFA's 1959 Convention in Miami. Soon afterward project was highly classified. Thrust is at least 30,000 pounds without afterburner. Efficient use of this engine in a Mach 3 cruise aircraft requires both variable-geometry inlet and exhaust nozzle. A-11 seems to have such systems with a movable centerbody in the inlet and a nozzle that changes the exit area. Altitude performance would improve if the inlet lips opened to enlarge the "capture" area and admit more air.

In recent years, the ability of Century-series fighters to zoom higher than 100,000 feet has tended to distort the picture as far as maximum cruise altitude and maximum level flight altitude are concerned. Most of the Century-series fighters cruise best between 35,000 and 45,000 feet, and their maximum level flight altitude is around 60,000 feet. Therefore, the A-11's ability to cruise in the 70,000- to 80,000-foot level is certainly not to be disparaged. With the A-11 cruising at Mach 3 at those altitudes, on a gentle dog-leg course, it would be essentially impossible for any operational fighter in the world to intercept it. And it is doubtful that any existing ground-based missile system could down the airplane.

• **Aerodynamic Efficiency.** The A-11 came along in time to benefit from several years of inspired aerodynamic research during the middle and late 1950s. By 1960 the unclassified literature had made it clear that

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the old idea that L/D (aerodynamic efficiency) was certain to be less than five at Mach numbers above 3 had to be discarded. There were strong indications that L/Ds of seven and eight and possibly higher could be attained.

These were still well under the L/Ds of eighteen to twenty-three at which subsonic transports and bombers operate. However, an L/D of eight is enough to bring the total flight efficiency (and range) of a supersonic airplane up close to that of the subsonic jet because propulsive efficiency increases rapidly at supersonic speeds. The idea that an economical supersonic transport (SST) was possible grew out of supersonic L/D research in the late 1950s, and the idea of the A-11 undoubtedly had the same beginning.

The basic rules for obtaining high L/D have been discussed exhaustively in NASA reports and the publications of the technical societies. The A-11 appears to use all of them. First, the wing leading edges are as sharp as possible, even sharper than those of the F-104. Second, the fuselage has a fineness ratio (length divided by diameter) of around eighteen, which gives it a very high internal volume for carrying fuel and equipment. Such design was found to be the optimum means for carrying any given weight at supersonic speeds, and the A-11 has the highest fineness ratio yet used on any aircraft.

Third, proper distribution of the pressure forces, the lift and drag forces, is a key to getting high L/Ds with any airplane. Several important techniques which bring pressure distributions closer to the ideal were developed during the 1950s. They primarily involved "twisting" and "cambering" the wing. The side-view photographs of the A-11, both looking endwise at the wing, clearly show its "twists" and "cambers."

Supersonic vehicles offer designers one unique opportunity for reducing drag and improving L/D. This is to arrange the vehicle components (fuselage, wing, tail, nacelles, etc.) so that they "interfere favorably" with each other. At subsonic speeds interference effects are negligible at a distance of more than a few inches away from any surface.

However, at supersonic speeds strong shock waves and pressure fields spread away from all objects. Pressure fields spreading from an aircraft's components can combine unfavorably to make the total vehicle drag much higher than the drag of the components taken separately.

Happily, this situation can be reversed. The components can be arranged so that their pressure fields and shock waves "cancel" out each other and reduce total drag. For instance, an engine nacelle outboard from a fuselage can throw a high-pressure field on the curved aft side of the fuselage to create a "thrust" force and reduce fuselage drag. The "ultimate" in favorable interference is a theoretical supersonic biplane postulated by Adolph Busemann in the 1930s. This was an arrangement of two wings, properly shaped and spaced apart, which canceled all of each other's wave drag at one particular Mach number.

In the 1950s supersonic interference effects were the object of intensive research, notably by Antonio Ferri of the Polytechnic Institute of Brooklyn and A. J. Eggers, Jr., of NASA. Their basic information was applied on the B-70, which is arranged so that a powerful positive pressure field is created on the lower wing surface by the engine air duct during Mach 3 cruise to increase lift and improve L/D. Design techniques for favorable interference have been under continuous refinement and are very important in the SST proposals now being evaluated by the FAA.

On the A-11, the area on the back of the fuselage between the engine nacelles is a highly critical flow area in which several strong pressure fields meet. Undoubtedly, the fuselage slopes off continuously in this area and forms a gentle ramp ending in the sharp point visible in the photographs. It would be possible to reduce drag, improve L/D, and increase the effectiveness of the vertical tails by creating favorable pressure fields along this ramp. The slope and contour of the ramp, the spacing and shape of the engine nacelles, the location of the vertical tails, and the flight speed all would be important in creating a favorable flow field and a high L/D. This leads to the conclusion that the A-11 is a single design point airplane. That is, it has a high L/D at its cruise Mach number, but its aerodynamic efficiency falls off at both lower and higher speeds. Consequently, the airplane probably doesn't have much growth potential in speed and would be in serious trouble about making its range if one engine were lost.

• **Structure.** The extent and the manner in which titanium is used in the A-11 has not been disclosed. However, the President's remarks hinted that titanium was the main load-bearing metal. If this is true, the A-11's airframe must be relatively light and efficient for a high-temperature structure. According to data from the SST program, it would have been possible to design the airframe for Mach 4 temperatures with only a slight increase in weight and probably the installation of new leading edges made of higher temperature material. The refractory metal alloys developed in the Dyna-Soar program, for example, would have a long life on a Mach 4 airplane.

After the heating problems the most important structural question about the A-11 is its design load factor. If the load factor were low, say two Gs at cruise, the structure would be extremely light, and amount to only about twenty percent of the airplane's total weight, or even less. Consequently, maneuverability would be sharply limited and the aircraft certainly would be marginal as an interceptor even if its missiles were extremely maneuverable. However, the light structure would result in a low-wing loading and a high cruise altitude, and it would allow a greater percentage of the airplane's weight to be carried as fuel, which would increase range.

If the design load factor were high, to allow seven-G turns, for instance, the structural weight would go up sharply. Such design would make the aircraft very useful as an interceptor or a bomber, but it would substantially reduce maximum cruise altitude and range.

The question of adapting the A-11 to an interceptor or a bomber mission depends largely upon the design

NOTE: In order to accommodate this important story in full, we have expanded the planned size of this issue of AIR FORCE/SPACE DIGEST. Please turn to page 50-A for continuation.—THE EDITORS

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load-factor, which, of course, is a closely held secret. Structural strength is more important in this case than the problem of incorporating the necessary electronics and missiles, for the A-11 is big enough.

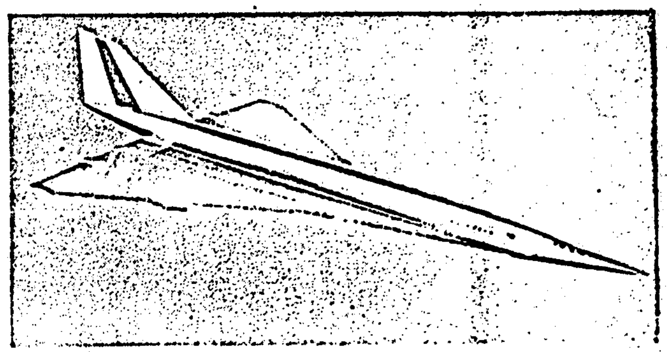
• Engine. Official reports dating back several years describe the Pratt & Whitney J58 as a simple supersonic turbojet with an afterburner. An early version lost the B-70 competition to the General Electric J93. If an early version is powering the A-11, the specific fuel consumption (SFC) is high and the range is low. Simple turbojets of the middle 1950s all ran on afterburner at Mach 3, and their SFC was more than two pounds of fuel consumed per pound of thrust per hour, compared to an SFC of about 0.8 for the best fan engines on subsonic jet transports.

However, great strides have been made in engine design, and it seems highly unlikely that a 1955 vintage supersonic engine would still be in the A-11. The J58 undoubtedly has been improved in many ways through higher operating temperatures, the use of advanced turbine-cooling techniques, better compressor blading, and possibly the addition of a fan and new thrust-augmentation systems.

If such engine improvements have been incorporated in the A-11, the SFC during cruise is down near 1.5 pounds of fuel per pound of thrust per hour. Figures almost this low are being quoted for the SST engines. And, in 1962, three Lockheed engineers—F. S. Malvestuto, Jr., P. J. Sullivan, and H. A. Mortzschky—in a most interesting paper before the Institute of the Aeronautical Sciences gave Lockheed's views of what could be done in the way of optimizing supersonic and hypersonic-cruise configurations in the near future. On the key question of achievable SFCs they said, "Propulsive efficiency [Mach number divided by SFC] of 2.0 . . . appears to be a reasonable value for any chemically-fueled pure-turbojet or dual-cycle propulsive system now available or projected in the near future." According to this estimate, the best expected SFC is 1.5 in the near future for Mach 3 airplanes.

One point, continually emphasized in the literature, is that the "match" between airframe and engine on supersonic-cruise airplanes is much more critical than on any aircraft of the past. Engine weight becomes a larger percentage of the total airplane weight, and fuel consumption rises sharply compared to subsonic powerplants, so the engine becomes relatively more important in achieving long range. Consequently, tailoring the airplane to achieve the best possible engine air inlet and exhaust flow conditions has a large payoff. This tailoring must be balanced by airframe considerations, however. On the relatively narrow-span supersonic airplanes the placement of engine nacelles, inlets, and exhaust flows can seriously affect the total flow pattern over an aircraft, which is the determining factor in achieving a high L/D.

On the A-11, the fuselage and the forward and aft portions of the double-delta wing apparently ride at an angle of attack of about four to five degrees during cruise. This angle gives maximum L/D for the A-11 type configuration. The openings of the engine air inlets and the inlet spikes are canted forward through



Lockheed proposed a double-delta wing for its supersonic transport (above). This is a Mach 3 aircraft weighing more than 400,000 pounds and capable of carrying 218 passengers more than 3,500 miles. A-11 can play a vital role in development of the SST by serving as systems test bed.

the same angle to face directly into the airflow and maximize inlet efficiency during cruise. The engine exhaust flow, however, nearly parallels the fuselage and is directed downward at an angle of about four degrees to the line of flight. Therefore, about seven percent of the thrust force is realized as lift to improve L/D and range.

In addition, the A-11 powerplants apparently have been placed so their thrust line is slightly below the airplane's center of gravity during most of the cruise flight. Therefore, the engines produce a nose-up pitching moment and reduce the amount of elevator deflection needed to trim the airplane. NACA reports have estimated that the proper placement of the engine thrust line to reduce trim drag of the elevator can increase range five to ten percent in aircraft of the A-11 type.

• Fuel. Several years ago there were reports that the J58 was being tested with boron fuel. If pentaborane were burned in the J58 afterburner—and research has shown this to be possible—then a thousand miles or more could be added to the A-11's range.

US production of borane fuels has been stopped, but Defense Secretary Robert S. McNamara last year told the Congress that enough was stockpiled to satisfy projected needs for the foreseeable future. The boranes are now being used in rocket-engine research, primarily by the Air Force, and conceivably the A-11 could draw from this reservoir.

Borane fuels are expensive compared to the hydrocarbons, and this is a major reason why the use of pentaborane was dropped from the B-70 plans. How-

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Air Force Association honored the designer of the A-11 last fall for earlier U-2 work. Here Lockheed's Clarence L. (Kelly) Johnson accepts von Kármán Trophy from USAF Vice Chief of Staff, Gen. W. F. McKee, at AFA Convention.

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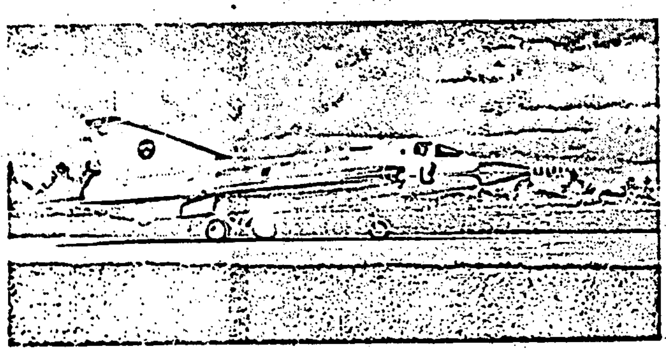
...ver, on a relatively small aircraft such as the A-11, with relatively limited numbers involved, the extra cost could be justified by the large performance improvement.

• **Range.** Maximum range on the A-11, if it is hydrocarbon fueled and powered by a J58 model only slightly better than the original version, probably is around 3,500 miles. This assumes an L/D of six, an SFC of 2.0, and fifty percent of the aircraft weight in fuel, with about one-third of it being consumed in the climb to altitude. Boron fuel would add around 1,000 miles to the range.

If it has been possible to achieve the maximum L/Ds and SFCs suggested in the Lockheed paper mentioned above, the range would go over 5,000 miles on hydrocarbon fuel. This assumes an L/D of eight and an SFC of 1.5. But this level of performance probably will not be achieved for some time.

• **Development Schedule.** It has been reported that the A-11 was delivered and flown for the first time in 1961; that is slightly more than two years after design



The world's first operational double-delta aircraft is the Swedish Air Force's SAAB J-35 Draken, a Mach 2 all-weather interceptor and ground-attack aircraft whose prototype first flew in October 1955. The aircraft, still in production, entered military service in early 1960.

work started. The same report also claims that the A-11 has been operational for two years, meaning 1963 and most of 1962. That would leave about one year, early 1961 to early 1962, for flight testing.

If this report is true, it would have been necessary during this one year to move in relatively small speed increments toward Mach 3 to make sure that all systems were responding properly to all speed, temperature, and vibration conditions. The inevitable "fixes" would have been made and the modified systems rechecked. Finally, it would have been necessary to move slowly toward maximum-range flights, by cruising at Mach 3 for longer and longer periods to ensure that all systems were withstanding the high-temperature "soaking."

Under any conceivable set of circumstances, designing, fabricating, flight testing, and bringing a pioneering, first-generation, Mach 3 cruise airplane to operational status in three years would be an almost miraculous achievement. True, the CIA-type management system is conducive to rapid developments. In effect, the CIA simply says to the contractor, "Bring us one of 'these.' We are making you responsible for performing all tests and making all technical decisions."

The U-2 was designed this way and delivered for first flight in little more than one year. But the U-2 was a completely straightforward project with a well-known type of wing, aluminum construction, and a slightly modified version of a well-developed turbojet. The A-11 designers were breaking new ground in every department, although they did have access to development data from the B-70 and J93 projects.

It seems reasonable that design, fabrication, and ground testing of the A-11 and its systems took nearly four years and that the first flight took place in 1963. Less than a year of flight testing probably would have allowed President Johnson to say that the aircraft "has been tested in sustained flight at more than 2,000 mph," and is "capable of . . . long-range performance of thousands of miles. . . ." He didn't say the range had been achieved.

But if the shorter development time reported is true, the SST program certainly bears review. If any Mach 3 cruise airplane can be brought to operational status from scratch in three years, then maybe the FAA is correct in taking the position that SST costs, technical uncertainties, and development time will be much lower than industry estimates.

Development of an economic supersonic transport is a much more difficult problem than the A-11, but if the CIA's hands-off management concept can indeed get us a Mach 3 airplane in three years, this concept certainly should be considered for the SST. And the Pentagon could benefit from this example as well.

• **Supersonic Transport.** The A-11 probably can spell the difference between success and failure in any US Mach-2.5-plus supersonic-transport program. The A-11 provides an immediately available means of getting vital flight-test time on all SST systems. It will yield data on the performance of titanium structure at Mach 3 that could not be obtained by any other means. And, when the SST engines are ready, the A-11 will allow them to be exhaustively tested in flight in a known vehicle and not an unproven SST airframe. By allowing such testing, the A-11 will fill a gap in the government's SST plan that has worried many in industry. The A-11 experience should make it possible to go ahead in an orderly manner and build the SST, which must be a true second-generation, supersonic-cruise airplane that has high aerodynamic and propulsive efficiency at all subsonic and supersonic speeds, and an extremely rugged titanium structure which can last through ten years of airline flying.

By any standard the A-11 is a magnificent technical achievement. Quite obviously it can outfly any known aircraft in the world by a substantial margin. It is a natural for reconnaissance. However, if the A-11 is from the U-2 mold and built with an extremely light airframe, it will not have significant combat potential as a bomber or an interceptor without major redesign. Even if such redesign is not forthcoming, the A-11 will play a key research role in building the technology of Mach-3-plus cruise airplanes of all types—transports, fighters, and bombers. In this role its ultimate importance to aviation and the nation may be as great as any aircraft ever built.—END

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AIRPOWER in the news

By Claude Witze

SENIOR EDITOR, AIR FORCE/SPACE DIGEST

Less Than the Whole Truth

WASHINGTON, D.C., MARCH 18

There are substantial reasons why public pressure should be maintained for the revelation of more facts about the new Lockheed A-11 Mach 3 airplane. And none of the facts that should be public property in this democracy will menace national security if they are disclosed. The A-11, like the TFX, the RS-70, and the Skybolt missile before it, is involved in arguments about concept and policy that are properly the subject of public discussion.

The general capabilities of the A-11 and the mission for which it was designed can be aired before Congress and the voters without disclosing any specific information about the technologies involved and the precise threat it presents to a potential enemy. If the A-11 is undergoing tests to determine how good it is as an interceptor, which is what we were told by the White House, the threat to the enemy will not be real until the system is combat ready. The A-11 is far from that state and may never reach it.

Details of President Johnson's announcement that the A-11 exists and an analysis of its technological significance appear starting on page 33 of this issue. Of equal importance is the Administration's insistence that the A-11 is an interceptor aircraft and that it meets the Air Force requirement for an Improved Manned Interceptor (IMI). So long as the news about the A-11 is carefully managed, the Administration is not likely to get a serious challenge to its assertion, but the atmosphere on Capitol Hill is charged with skepticism. When Gen. Curtis E. LeMay, USAF Chief of Staff, was testifying a few weeks ago before the House Armed Services Committee, he said, "We need a new long-range interceptor and we feel that $40 million this year will move us in an orderly program toward producing it." Asked at what point we are in the IMI program, he said, "We are doing some work in this field, but we are not going fast enough to have an orderly program to produce it." He made a further statement that was deleted from the published record.

Whatever the General told the committee in confidence, the House included the $40 million in its version of the defense authorization bill. There is no evidence in the record that Chairman Carl Vinson or any of his colleagues knew of the A-11 or considered it the prototype of an interceptor if they did know about it. Chairman Melvin Price of the Subcommittee on Research and Development voted with the majority in favor of granting the money. Three Democratic members of his subcommittee, Representatives Samuel S. Stratton, Jeffrey Cohelan, and Otis G. Pike, voted against it and signed a minority report. In this, they argued the money had not been requested from the subcommittee but indicated they knew of progress made toward an IMI. They then picked up the argument of Defense Secretary Robert S. McNamara that there are several airplanes which could take on the IMI mission, citing the F-106, the F-4, and the TFX or F-111. General LeMay already had said he wants something better.

There was a strange change of attitude in the Senate. The $40 million item was dropped from the bill. After the A-11 was uncovered Senator Richard B. Russell, floor manager for the bill, bolstered the President's portrayal of it as an interceptor. He said he had been privy to all of its history and that what has been learned has applicability to other types of aircraft. The Senator said the $40 million was taken out of the bill because the A-11 already is past the research-and-development stage and is undergoing test and evaluation. He said he did not know why the Air Force, meaning General LeMay, asked for the money.

Secretary McNamara was the next witness in Washington. He told a press conference, "The A-11 is an interceptor aircraft, it is being developed as such, and beyond that I have nothing further to say on its use." He said the Air Force naturally knew all about the A-11 and that there was a misunderstanding about what was requested. This was not new money, he said, but a request "to have the authority within the total funds budgeted to reallocate funds to increase the expenditures on the IMI and to reduce expenditures on certain other projects." He said there is no doubt that the A-11 is the plane USAF has in mind for the IMI mission.

One of the more significant sentences in Mr. McNamara's remarks was his comment that "hopefully, we can have multi-use aircraft evolve from the single-purpose designs."

It is this conviction of his, first brought to fruition in the TFX joint USAF-Navy project, that has not been accepted by experienced airmen in any branch of the services. The A-11, it has not been denied, was laid down in 1959 as a high-flying and fast reconnaissance airplane and the undisclosed amount of money that has gone into it would be hard to disguise in USAF's budget. It could have been financed by the Central Intelligence Agency, but that is not as important as the fact that the reconnaissance and interceptor missions cannot be performed efficiently by the same airplane. It is obvious that the technologies overlap in such areas as propulsion, materials, human factors, and aerodynamics, but weapon systems differ according to their missions.

All through the discussion following the A-11 announcement there has been an aura of the half-truth about Administration statements. Asked bluntly whether the A-11 had been designed as an interceptor, Secretary McNamara replied, "I don't think that I said that, and I would rather not say." Nobody asked, "Why not?" It was brought out in General LeMay's testimony that all of the Chiefs of Staff favored going ahead with an IMI and that even the Chairman, Gen. Maxwell Taylor, gave it his endorsement. USAF Secretary Eugene Zuckert testified that "No formal proposal has gone forward from the Air Force, that is, from the civilian Secretary [Mr. Zuckert] to the Secretary of Defense. I did write him a letter in which I said it looked as if we were progressing to the point where we would need a sizable sum of money such as the one General LeMay mentioned [for] 1965."

(Continued on page 19)

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... Rep. Porter Hardy quizzed the Air Force Secretary and asked whether Mr. McNamara showed any signs of "mellowing" or beginning to understand the requirement for an IMI. Mr. Zuckert acknowledged that his boss was not "too encouraging." He added that he favors a larger development program than the Defense Secretary, but "I have not personally proposed that we build a force of any particular size leading toward a full defense capability with an IMI."

Further quotations are not needed to display the status of the IMI project, at least as it stood in February. If we accept the natal date of the A-11 as 1959, it seems clear that nobody called it an Air Force airplane at least until sometime in 1963, by which time the concept probably had been overtaken by more esoteric systems operating in space. If the A-11 was designed as an IMI there was no reason to blanket its existence with any more secrecy than would have surrounded the F-108, interceptor counterpart of the B-70 and also designed by North American Aviation, if that project had not been abandoned a few years ago. It was after cancellation of the F-108 that airmen concerned with the defense mission, most notably Gen. Laurence S. Kuter, first proclaimed the requirement for an IMI. If they knew the A-11 was being developed as an interceptor, which they should have known if it is true, their speeches, in retrospect, make little sense.

Since disclosure of the A-11 by President Johnson, most of the verbiage has been concerned with its place in the history of aeronautical progress and the fact that the story was kept out of the public prints, whether by publicists or patriots. The emphasis has been in the wrong places. The sophisticated observer, be he aeronaut, editor, or military officer, knows that USAF does not develop a new interceptor by starting with a vehicle that flies higher and faster, with limited maneuverability, and then try to determine its capability. The interceptor capability would be built in, starting on the design boards. There is much justification for suspecting that the A-11 has been used for manipulation of American public opinion, possibly to cast aspersions on Air Force competence in an area of Air Force specialization. The outlook for national security is frightening if this kind of manipulation is allowed to continue, making it look as if technology escaped the grasp of the men with the mission.

Why Doesn't Anybody Get Mad?

As we write this, the East Germans, who are Communists, are withholding information on the condition of three USAF officers who were shot down a few days ago when their RB-66 reconnaissance bomber strayed out of its flight path. A compilation by the Associated Press shows that in the past fourteen years at least eighty American military flyers have been killed by Russians in attacks that ranged from the Baltic Sea to the Sea of Japan. The airmen have been from the ranks of the US Navy, Marines, and Air Force.

So far, there has been no sign of official indignation in Washington other than a demand for the release of our men. Our attitude, according to the Washington *Post*, is tempered by our "hopes to avoid having the incident damage the relatively moderate climate of present American-Soviet relations." Indeed, the *Post*, which should know better, peers around the eighty corpses and poses an editorial question: "What is wrong with the Air Force that it cannot prevent its planes from wandering over Communist East Germany and getting shot down?" Then the paper says USAF does not say the airplane strayed but suggests it was lured by phony radio signals.

Somehow, the lives of eighty American flyers seem to have been sacrificed in near silence while the climate of our relations with Russia shows no material change. It should be pointed out that the Washington *Post*, which hesitates to put any blame on the Russians, is a paper that speaks out loud and clear in favor of avoiding escalation in any conflict with the Reds. The response should be nonviolent to most provocation, according to this school of thought, and if it must be violent it should be graduated to the minutest degree possible. The Communists disagree.

Any responsible reporter could learn by asking that USAF pilots have strict orders not to resist challenges in the air, even if they are armed. The Russians, in this case, destroyed an airplane which they could have had intact with its airborne equipment if they had told the pilot to land instead of shooting him down. This indicates they were more intent on murder than capturing the RB-66 to see what reconnaissance equipment it was carrying. A responsible reporter also could have learned that the pilot was following a filed flight plan for a navigation training mission that was to be flown entirely in France and West Germany. An informed reporter would know that the RB-66 is an obsolescent airplane and it is not likely it would be sent on a sensitive mission so close to the Iron Curtain. Even an editorial writer, lacking all these facts, should be able to recall that in late January a T-39 jet trainer out of Wiesbaden strayed across the border and was shot down, killing the crew of three USAF officers. In this case the Reds merely said it was our fault because we violated their airspace, and they gave us permission to retrieve the bodies and wreckage.

It is not generally discussed, but these violations of airspace have at least one of the characteristics of a cultural-exchange program. The Russians violate airspace too. They have overflown Alaska and are reported to have violated Western airspace in Europe at least twenty times in 1963. They have been intercepted by our airmen and warned to go back. There is no record that they have been fired upon. On top of this, it is no secret in Europe that Aeroflot, the Russian airline, and Polskie Linie Lotnicze, its Polish counterpart, treat airlanes with disdain. On scheduled flights to and from such major points as Paris, their pilots wander far from their routes as assigned by traffic controllers. There is a strong conviction on the Continent that these deviations are not accidental, but are part of the Communist reconnaissance effort.

In view of the record, it is difficult to believe we are dealing with reasonable people concerned in any way about the climate of our relations. It is even more difficult to understand how an American newspaper, in particular the Washington *Post*, can ignore the Soviet trigger finger, the eighty dead, and the nature of the cold war.

Reading Loud, But Not Clear

Almost exactly a year ago Lt. Gen. Alfred S. Starbird, an Army officer who serves as Director of the Defense Communications Agency, told a committee on Capitol Hill the Defense Department needs a satellite communications system as soon as possible. Testifying before Rep. Chet Holifield and his Military Operations Subcommittee of the Committee on Government Operations, General Starbird cited some of the reasons why communication through space has become essential to military operations. Clearly, the ballistic missile has changed the threat to existing systems as much as it has altered national strategy. The missile, the General said, puts a new premium on speed. Service must be almost instantaneous. The communications

(Continued on following page)

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